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Research Article

The landscape of Digital Nudging Research: A Bibliometric Review of Gaps, Emerging Themes, and Future Research Directions

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ABSTRACT

Introduction:

Digital technologies are shaping decision-making more and more in areas like banking, retail, healthcare, and public services. As an answer to the challenges of complicated choice environments which may lead to cognitive overload, digital nudging has arisen as a behavioural intervention designed to alter user decision-making in predictable ways through subtle changes in the interface design without restricting freedom of choice. Theoretical integration and cumulative knowledge development are challenges, as research on digital nudging is scarce and dispersed in different scholarly disciplines despite an increasing interest.

Objectives:

The purpose of this study is to systematically map the intellectual structure and evolution, identify key themes and influential contributors in digital nudging research, as well as to explore critical research gaps for future scholarly inquiry.

Methods:

The research conducts a bibliometric and conceptual analysis of 605 publications dated from 2002 to 2025 based on the Web Science database. The analysis uses Biblioshiny from R and includes descriptive performance indicators such as publications, authorship patterns, co-word analysis of thematic mapping and collaboration analysis to investigate publication trends, thematic structure, and intellectual origins of the field.

Results:

The results show that digital nudging is an emerging and multidisciplinary area of research, where behavioral economics, information systems and marketing contribute predominantly. Behaviour, information, and intervention effect are core themes; emerging areas like ethics, privacy and trust remain underdeveloped. Existing work is heavily biased toward low-dimensional, short-term experimental designs with relatively few longitudinal studies and little consideration of the underlying psychological mechanisms. In addition, gaps related to AI-driven nudging, cultural and institutional contexts of AI, and governance frameworks are identified.

Conclusions:

Almost all studies focus on specific applications of digital nudging (e.g., notifications, social norms) and thus lack theoretical perspective, as it tries to identify underlying mechanisms taking place in multiple settings based on the same theoretical framework (Fischer et al., 2020), while utilizing diverse ways of informing users. This study contributes to developing a fresh, integrated, ethically well-founded, and methodologically sound research agenda by identifying seven main Research Gaps and twenty-eight future research questions. The results are helpful for researchers, practitioners and policymakers who need to design responsible and effective digital interventions.

Keywords: Digital nudging; Bibliometric review; Choice architecture; Behavioural design; Ethical persuasion; User experience

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INTRODUCTION

Digital technologies increasingly mediate decisions in everyday life, ranging from online shopping and banking to health management, education, and public services. While digital environments facilitate scale and efficiency, they also offer users complex choice environments, as well as information overload and cognitive burden. In reply, academics and practitioners looked at digital nudging as a design of behavioural cue that indirectly influences users to make decisions without compromising their freedom to choose.

Drawing on behavioural economic, nudging shapes behavior by centering on choice architecture instead of mandates and incentives (Thaler & Sunstein, 2008). With the move of decision making into digital interfaces, nudges have transformed into interface-embedded cues like defaults, framing, feedback, and algorithmic personalization known under the term digital nudges (Weinmann et al., 2016). Workbooks nudge constantly and at scale, which also drives up both the scope of their impact and ethical implications.

The digital nudging literature has received increasing scholarly interest, yet it is scattered through information systems, marketing, psychology, health science and public policy. Much of the research examines isolated mechanisms or domains of application constraining cumulative theory development.

OBJECTIVES

The research objectives of this study are:

1. To investigate how has digital nudging research evolved in terms of publication trends and growth patterns?
2. To analyze which authors, institutions, journals, and countries have shaped the field?
3. To evaluate what is the core intellectual and thematic structures?
4. To assess what emerging themes and research gaps define the future of digital nudging scholarship?

METHODS

Behavioural Economics and Choice Architecture

Second, Behavioural Economics questions the hypothesis of perfect rational decisions and argues instead for boundedly rational decisions (Simon, 1955; Kahneman, 2011) based on heuristics and cognitive biases. The theory of choice architecture describes how decision environment cues systematically affect behavior without making any options disappear (Thaler & Sunstein, 2008).

Nudges deploy these insights by rendering some options more salient or simpler to opt for, while maintaining the freedom of choice. This libertarian paternalistic principle forms the basis of both traditional and digital nudging.

Digital Nudging

Digital nudging can be understood as the application of choice architecture in digital domains, utilizing design features and interface elements as behavioural cues. These include, for example, default click-on “subscription” settings, the visual salience of features within e-commerce interfaces, progress bars in mobile apps or personalized recommendations by algorithms (Mirsch et al., 2017).

Whereas physical nudges are localized entities, digital nudges are scalable and adaptive, particularly since they become increasingly AI-powered in nature. This process not only makes them more effective but also raises questions of transparency, privacy, and potential for manipulation (Schneider 2018).

Methodology

Data Collection: The bibliometric database is composed of 605 documents published from 2002 to 2025 included in the most important educational databases (journals, books, and conference proceedings) spread over a total of 459 sources. Only English-language publications were included. Analysis was performed with the use of Biblioshiny, a

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bibliometric analysis tool in R popular within business and management research (Aria & Cuccurullo, 2017).

Analytical Procedures: Following established bibliometric guidelines (Donthu et al., 2021), the study employed:

- Descriptive performance analysis (publication growth, citation patterns)
- Science mapping techniques (co-word analysis, thematic mapping)
- Collaboration analysis (authors, institutions, countries)

RESULTS

Descriptive Overview

Table 1. Descriptive Statistics of Digital Nudging Research (2002–2025)- (Source – Biblioshiny report, open source package from R Studio which is free download and use)

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2002:2025
Sources (Journals, Books, etc)	459
Documents	605
Annual Growth Rate %	17.4
Document Average Age	3.37
Average citations per doc	12.16
References	0
DOCUMENT CONTENTS	
Keywords Plus (ID)	1260
Author's Keywords (DE)	2122
AUTHORS	
Authors	2055
Authors of single-authored docs	75
AUTHORS COLLABORATION	
Single-authored docs	81
Co-Authors per Doc	3.83
International co-authorships %	32.23
DOCUMENT TYPES	
article	389
article; book chapter	5
article; first access	23
article; proceedings paper	1
correction	1
editorial material	9
letter	1
meeting abstract	1
proceedings paper	148
review	27

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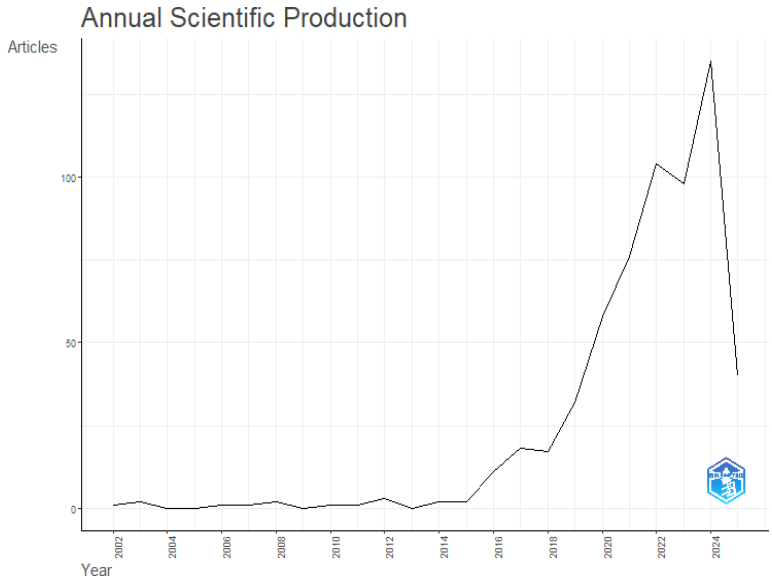
Based on the data from Table 1, the findings suggest that digital nudging is a fast-growing yet still very new field of research, which shows particularly strong interdisciplinary collaboration and an increasing academic relevance.

Publication Trends- Influential Sources, Authors, Institutions and Countries

Figure 1. Annual Scientific Production of Digital Nudging Research - (Source – Biblioshiny report, open-source package from R Studio which is free download and use)



The graph of Figure 1 indicates that there is a low level of activity before 2015 and an almost exponential increase after 2016, which was the year when digital nudging became introduced as a research construct (Weinmann et al., 2016).

Table 2. Most Relevant Journals in Digital Nudging Research- (Source – Biblioshiny report, open source package from R Studio which is free download and use)

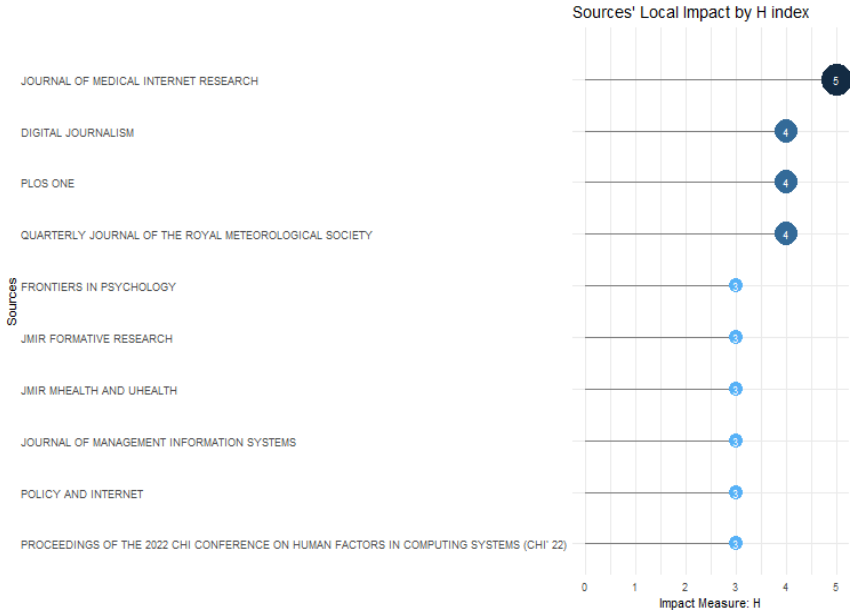


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Table 3. Most Relevant Affiliations and Country Scientific Production- (Source – Biblioshiny report, open source package from R Studio which is free download and use)

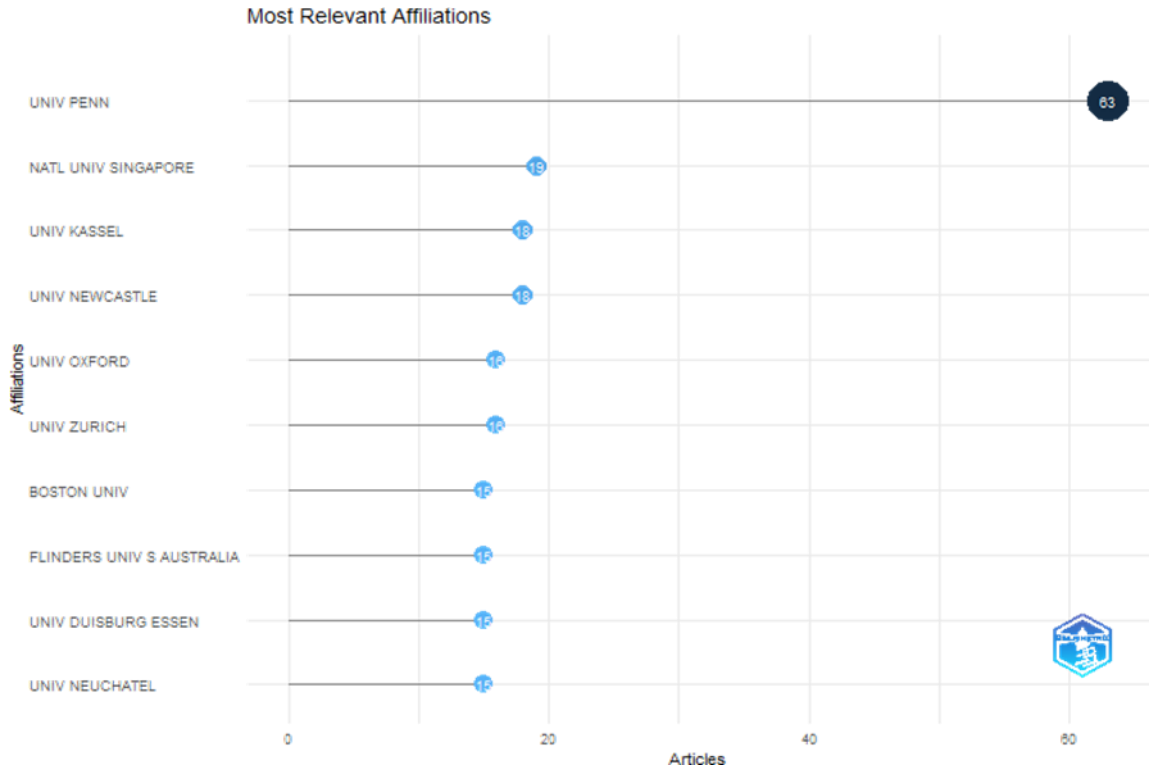
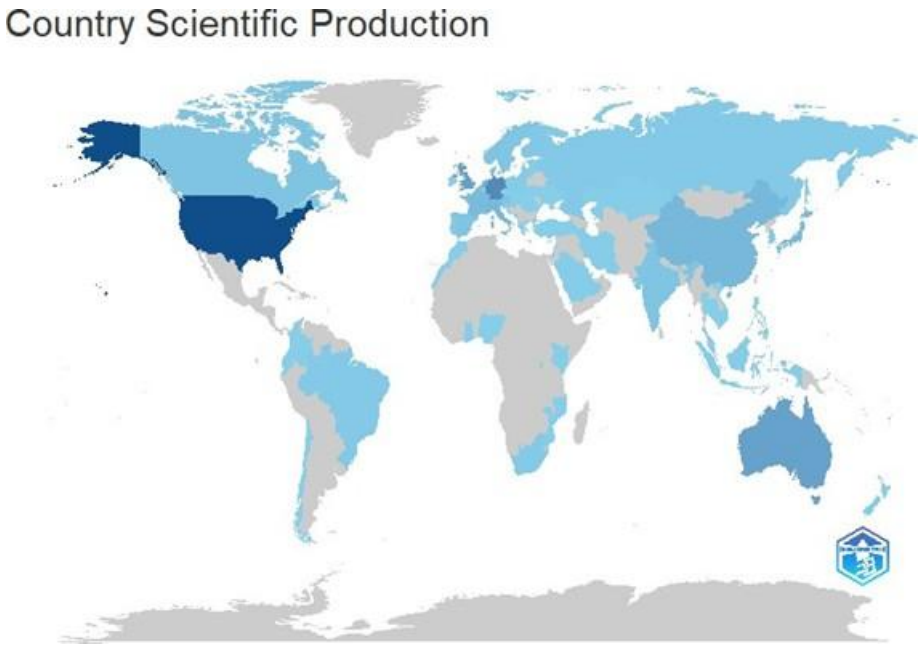


Figure 2. Country Scientific Production- (Source – Biblioshiny report, open source package from R Studio which is free download and use)



As per Figure 2, which shows Country Specific Production, the number of scientific papers produced per institution and country show that the digital nudging body of research is geographically centred while it has global influence. This is displayed in the "Most Relevant Affiliations" table referring to Table 3, selected universities are responsible for a sizeable portion related publication, leading to the forming of strong research clusters and spouts of specialized expertise on digital behavioural design and choice architecture. This focus is on line with the interdisciplinary

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grounding of digital nudging, which spans across references from behavioural economics, information systems and public policy studies. Referring to Table 2 also indicates that Digital nudging is still a developing research area. Meanwhile, there is a powerful global presence of USA in the Country Scientific Production map, with strong signals of European (to be precise UK, Germany, and the Netherlands) and growing Asian/Australian input. A strong U.S. presence is in line with the fact that nudge theory, and behavioural public policy more generally, was initiated there (along with its roots in marketing), while European contributions represent regulatory and ethical considerations of digital governance. Preliminary findings from Asia indicate an increasing focus on platform- based behavioural interventions and digital adaptation settings. Taken together, these figures suggest that while digital nudging work is internationally dispersed, intellectual leadership is concentrated in a few developed economies of the world, signaling further possibilities for cross-cultural collaboration and comparative analysis across institutional contexts.

Thematic Structure

Figure 3. Thematic Map of Digital Nudging Research- (Source – Biblioshiny report, open source package from R Studio which is free download and use)

Figure 3, The thematic analysis highlighted behavior, information, and impact of the intervention as key research clusters with ethics, trust and privacy constituting understudied yet more crucial themes.

The thematic map positions research clusters based on centrality (relevance) and density (development). Four dominant quadrants emerge:

- Motor Themes: Behavior, information, impact

  Motor themes represent the intellectual backbone of digital nudge research. The dominance of health-related nudging indicates that digital nudges are primarily examined in public health, mental health, and risk-reduction contexts,

- Basic Themes: Choice architecture, consumption, nudges

  These are fundamental themes, the heart of the subject. Nevertheless, even though digital nudging has been increasingly invoked, itself it does not have unified theoretical models, standard constructs, and consistent operationalization.

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- Emerging Themes: Ethics, privacy, trust, pro-environmental behavior
- Niche Themes: Sensor-based nudging, context-aware systems

Key Insight: While behavioural and informational themes dominate, ethics-oriented and AI- driven themes remain underdeveloped, signaling major research opportunities.

Keyword Evaluation over time

Figure 4. Keyword Frequency Evolution in Digital Nudging (2010–2025)- (Source – Biblioshiny report, open source package from R Studio which is free download and use)

Description for Figure:

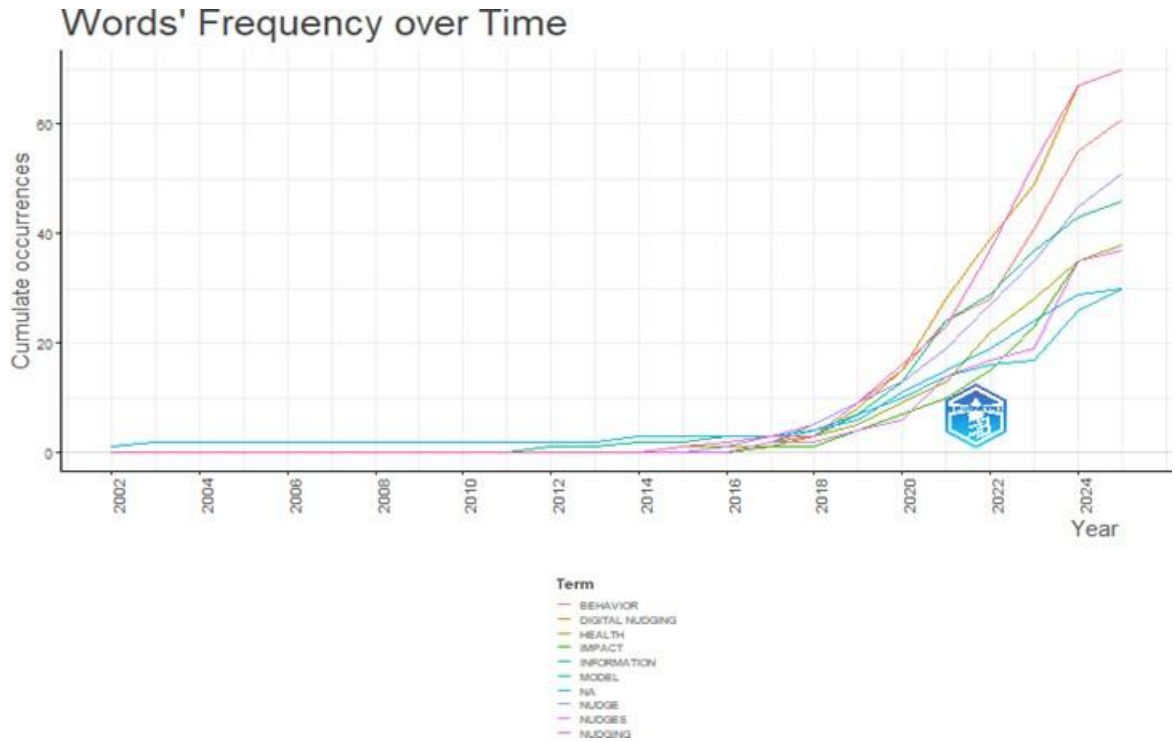

Figure 4 illustrates how behavior, health, information, technology, and impact immediately enter a rapid growth phase following 2018 while privacy, trust and ethics rise in the aftermath of 2020.

Interpretation:

This trend indicates a move "from does nudging work? to "when, how, and should nudging work? and, hence, the importance of an ethically grounded theory.

Co-word Network Analysis

Figure 5. Co-Word Network of Digital Nudging Research- (Source – Biblioshiny report, open source package from R Studio which is free download and use)

Description for figure:

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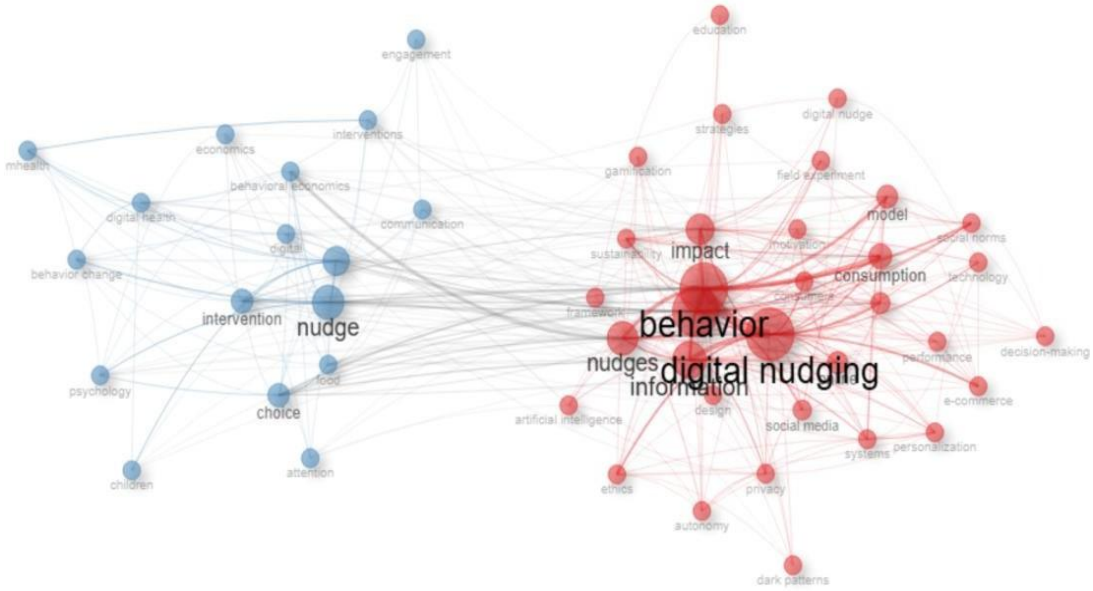
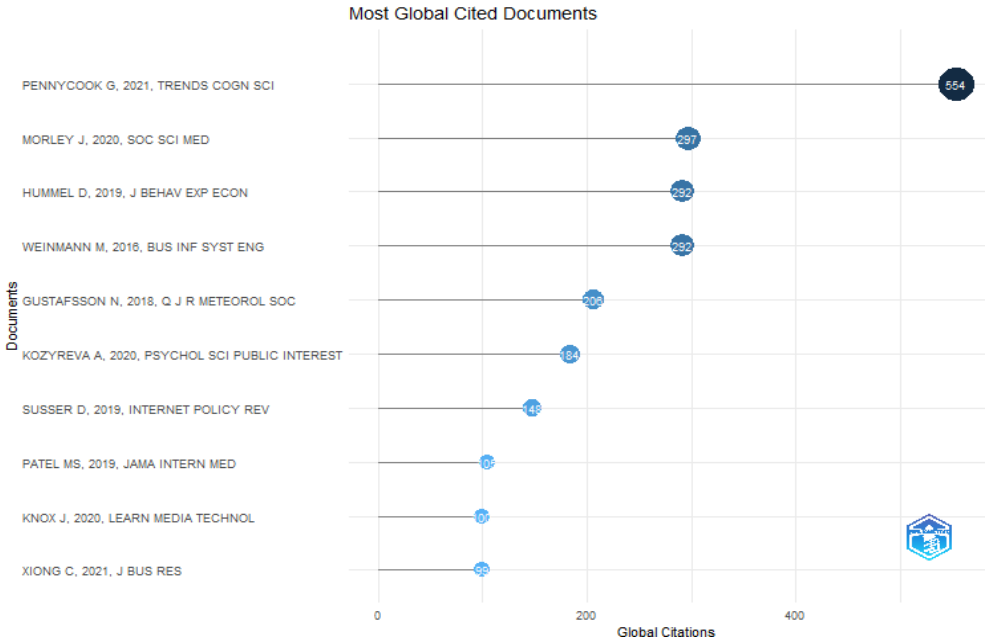


As shown in Figure 5, the network graph shows behavior, information, and impact as core bridging nodes connecting health, technology, and sustainability clusters.

Key Insight:

Digital nudging studies are based in behavioural science but now incorporate AI systems, UX design, and ethical governance, thus highlighting the relevance of the framework.

Table 4. Most Global Cited documents- (Source – Biblioshiny report, open source package from R Studio which is free download and use)



In Table 4. figures indicate roots in a handful of core seminal papers for digital nudging research. There are a few "classic" papers which frame the literature, focused on choice architecture, default effects and behavioural interventions effectiveness. This focus suggests that the field is still firmly rooted in fundamental theoretical work, which continues to influence later empirical work.

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DISCUSSION

The bibliometric dataset about digital nudging research suggests an emerging field that grew rapidly and diversified in its thematic development during the last 20 years. Publications were sparse at the outset and conceptually grounded in behavior economics and classical nudge theory; but from the mid-2010s on, output has increased steadily. There is an exponential growth in the digital platforms, mobile apps, and algorithmic suggestion systems.

This has led to the policy interest in behavioural interventions in online ecosystems and other digital spaces. The waving body of recent literature indicates that digital nudging is not just a conceptual point of discussion the nudge phenomenon, but it has become an emerging research security within digital ecosystems.

The literature evidence cross-fertilization between marketing, information systems, public policy, behavioural science, health studies and digital governance. Notwithstanding this distribution, the quality of publications in the field is moderate, suggesting continued research interest and increasing academic coherence. The dataset presents collaborative authorship patterns that mirror the interdisciplinary of digital nudging beyond psychology into design, technology, and management research. But global cooperation is still too lopsided, with intellectual leadership vested in a few advanced digital economies.

From keyword and theme patterns, we observe that health appears as the predominant stream of research, especially in domains such as mHealth, risk reduction interventions and sustainable behavior interventions. A separate cluster entails consumer behavior and online decision-making environments (default options, framing effects, social norm nudges) in e-commerce and platform settings. Recent publications have an increasing tendency toward ad- dressing ethicality, privacy, and algorithmic governance - signaling a transition towards responsible digital design. Further, there is nascent work on AI-based and personalized nudging systems, but theoretical consolidation does not exist here.

The literature is also methodologically very experimental and short-termed behaviourally oriented. Empirical testing consists primarily of laboratory and online experiments, a small number of longitudinal studies, real-world field experiments, and big data-based behavioural analyses. This methodological focus highlights opportunities for more endogenously dynamic, time-bound inquiries of sustained behavioural change and algorithmic effects.

In sum, the descriptive analysis that we have presented suggests that digital nudging research is rich in applications and has been expanding rapidly but is theoretically dichotomous and methodologically focused. The field is transitioning from classical behavioural intervention trials towards more advanced, AI-informed, and governance-related digital decision architectures. Such a developmental path highlights the critical importance of further theoretical consolidation, cross-contextual validation, and integrative methodological progress.

The results reveal that research on digital nudging is application-intensive but theory-scarce. Health is the largest class of applications and there is still limited support towards theoretical roadmap.

Notwithstanding the increasing empirical attention on this issue, three shortcomings remain:

- Too experimental design dependent
- Restricted longitudinal investigations
- Theoretical integration across domains is not strong enough.

The field is moving towards algorithmic and AI nudging systems, but conceptual clarity continues to be left behind by technology.

Managerial and Policy Implications

The framework emphasizes aligning digital nudges with user goals and incorporates transparency in design of the interface. The results highlight the importance of governance measures for policy makers to differentiate between ethical nudging and manipulative digital practices, particularly in sensitive issue areas like health and finance.

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Contributions to Business and Management Research

The paper adds to the literature by (1) providing a systematic mapping of digital nudging using bibliometric research methods, (2) offering an integrated view on fragmented findings based on the test of a theory-driven conceptual framework, and (3) by framing ethical transparency and autonomy as core boundary conditions in digital behavioural design.

Methodological Implications and Suggestions for Future Research: Gaps and Research Questions

To advance digital nudging as a more theoretically mature and ethically vigilant research field, the present article argues that future work needs to tackle the following critical points:

Gap 1: Lack of Longitudinal Evidence

Issue:

Most of the digital nudging research observes short-term behavior change, thereby revealing little about the development and loss of habits or 'nudge fatigue' (Sunstein, 2017).

Future Research Questions:

• RQ1: Do digital nudges lead to sustained behavioural change over time?

• RQ2: How do users adapt to repeated nudging exposure in digital environments?

• RQ3: Under what conditions does nudging effectiveness diminish or reverse?

Gap 2: Psychological Mechanisms Are Under-Measured

Issue:

Without directly measuring cognitive and emotional processes, many of the studies also beg the question about how these mechanisms are believed to operate (Kahneman, 2011).

Future Research Questions:

• RQ4: Which psychological mechanisms most strongly mediate digital nudging effects?

• RQ5: How do cognitive load reduction and perceived autonomy interact in shaping user responses?

Gap 3: Ethics Treated as Peripheral Rather Than Central

Issue:

Bibliometric evidence places ethics as a nascent but under-explored topic, despite increasing attention to dark patterns and manipulation (Gray et al., 2018; Mathur et al., 2019).

Future Research Questions:

• RQ6: How does ethical transparency impact the acceptance of personalized nudges?

• RQ7: What is the line between ethical nudging and manipulation in AI based systems?

Gap 4: AI-Driven Personalization and Algorithmic Opacity

Issue:

Although personalization can increase nudge effectiveness, it reduces transparency and explain ability (Acquisti et al., 2017).

Future Research Questions:

• RQ8: How does explainable AI moderate trust on personalized digital nudges?

• RQ9: Are there differences in users' reactions on nudges designed by human and generated by algorithms?

Gap 5: Cultural and Institutional Contexts Are Underexplored

Issue:

Most digital nudging research is focused on Western economies, which constrains generalizability.

Future Research Questions:

• RQ10: Which cultural values and regulatory regimes explain variation in nudging effectiveness?

• RQ11: Are digital nudges work in emerging markets?

Gap 6: Domain-Specific Outcomes Need Deeper Examination

Issue:

Health once again tends to be the most popular for application areas, while finance, education, sustainability, and public services are still scattered.

Future Research Questions:

• RQ12: How do digital nudges operate differently across high-risk vs low-risk decision contexts?

• RQ13: Can nudging frameworks be standardized across domains without loss of effectiveness?

Gap 7: Measurement and Evaluation Standards Are Missing

Issue:

There is no well-established benchmark and metric to measure the effectiveness of nudges. Future Research Questions:

• RQ14: What is a "success" of a digital nudge from the point of view of users?

• RQ15: How to jointly assess behavioural effectiveness, ethical acceptability, and business value?

Limitations

This study is a review and conceptual study; it does not cover any empirical examination of the proposed framework. It has extracted all the published papers from the Web of Science database from 2002 to 2025. Web of Science is comprehensive and accepted but will always be limited to its repository. Only English language publications were extracted for this study.

CONCLUSION

The study combines bibliometric evidence with conceptual theory building, provides future directions to expand digital nudging research to toward collective knowledge building. With smart and personalized digital interfaces on the rise, responsible nudging in the digital realm will be necessary to balance business goals with user welfare.

Disclosure of Interest: The authors declare that there are no conflicts of interest associated with this manuscript.

Data Availability Statement: No new data were generated in this study. Peer-reviewed published articles from the Web of Science repository were extracted for this study. On request, the entire repository of papers extracted from the Web of Science and the Biblioshiny report will be made available.

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